Claims

1. A method for determining the refractive index and/or compensation of the influence of refractive index during interferometric length measurements with the aid of an interferometer (13, 13') to which there are applied at least two measuring beams (v_2, v_3) having at least defined frequencies approximately at a harmonic ratio to one another, and at whose output phases for the at least two measuring beams (v_2, v_3) are evaluated, the interferometric phases being multiplied in an interferometrically fashion corresponding to the harmonic ratio of the frequencies of the measuring beams (v_2, v_3) and at least one phase difference of the phase values thus formed being examined, characterized in that at least one of the measuring beams (v_3) is of variable frequency, and in that from the phase difference formed a control signal is formed in order to vary the frequency of the variable frequency measuring beam (v_3) and is used to control the frequency such that the phase difference vanishes.

2. The method as claimed in claim 1, characterized in that at least one reference beam (v_1) is generated at a frequency that corresponds approximately to the frequency of one of the measuring beams (v_3) and is coupled to the frequency of another measuring beam (v_2), and in that a frequency difference is measured between the frequency of the reference beam (v_1) and the frequency of the corresponding measuring beam (v_3).

3. The method as claimed in claim 2, characterized in that one of the measuring beams (v_2) and the reference beam (v_1) are generated by a coherent radiation source (L1) with a frequency multiplier.

4. The method as claimed in one of claims 1 to 3, characterized in that the two measuring beams (v_2, v_3) are derived from a beam of a coherent radiation source (L1) by means of a frequency splitter (36).

5. The method as claimed in one of claims 1 to 4, characterized in that high frequencies (Ω, 2Ω) that are at the same harmonic ratio to one another as the frequencies of one of the measuring beams (v_2) to the reference beam (v_1) are modulated onto the superimposed measuring beams (v_2, v_3) in a reference branch of the interferometer (13').

6. An interferometer arrangement for carrying out the method as claimed in one of claims 1 to 5, having at least one coherent radiation source (L1, L2) for generating at least two measuring beams (v_2, v_3) having defined frequencies approximately at a harmonic ratio to one another and having an interferometer (13, 13') whose output signals are passed to a beam splitter (DST 13, DST 22, DST 32) separating the measuring beams, the separated measuring beams being passed to optoelectronic transducers (PD12, PD13; PD22, PD23; PD32, PD33), and at least one of the output signals of the optoelectric transducers being fed to a multiplier (16, 22, 32) corresponding to the harmonic ratio of the frequencies of the measuring beams (v_2, v_3), characterized in that the frequency of at least one of the measuring beams (v_3) can be varied by means of a frequency controller (18, 23, 35), and in that a phase comparator (17, DBM) for the phases of the output signals of the optoelectric transducers (PD12, PD13, PD22, PD23; PD32, PD33) is used to generate a control signal representing a phase difference, which control signal is fed to the frequency controller (18, 23, 35) to form a control loop for the interferometric phases (ϕ_2, ϕ_3).

7. The interferometer arrangement as claimed in claim 6, characterized in that the coherent radiation source (L1, L2) is designed to generate at least one reference beam (v_1) whose frequency corresponds approximately to the frequency of one of the measuring beams (v_3) and is harmonically coupled to the frequency of another measuring beam (v_2).

8. The interferometer arrangement as claimed in claim 6 or 7, characterized by a frequency multiplier assigned to a coherent radiation source (L1, L2).

9. The interferometer arrangement as claimed in one of claims 6 to 8, characterized in that use is made in a reference branch of the interferometer (13, 13') of a frequency modulator (30) whose controller is connected to a high frequency generator for two high frequencies (Ω, 2Ω) whose frequency ratio to one another is that of the frequencies of the measuring beams (v_2, v_3).